

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

NEW ENGLAND CARPENTERS
HEALTH BENEFITS FUND; PIRELLI
ARMSTRONG RETIREE
MEDICAL BENEFITS TRUST;
TEAMSTERS HEALTH & WELFARE
FUND OF PHILADELPHIA AND
VICINITY; and PHILADELPHIA
FEDERATION OF TEACHERS HEALTH
AND WELFARE FUND; DISTRICT
COUNCIL 37, AFSCME-HEALTH &
SECURITY PLAN; JUNE SWAN;
MAUREEN COWIE and BERNDARD
GORTER,

Plaintiffs,

v.

FIRST DATABANK, INC., a Missouri
Corporation; and McKESSON
CORPORATION, a Delaware Corporation,

Defendants

Civil Action No. 1:05-CV-11148-PBS

**UPDATED DECLARATION OF RAYMOND S. HARTMAN
IN SUPPORT OF PLAINTIFFS' MOTION FOR CLASS CERTIFICATION**

Executive Summary

I have analyzed whether the members of the proposed Class of payors identified in the Plaintiffs' Complaint have been impacted, injured and damaged economically as a Class as a result of the alleged Five Percent Spread Scheme. I conclude that they were for the following reasons. The drugs subject to my analysis, branded self-administered drugs, relied upon the First DataBank (FDB) AWP as the benchmark for reimbursement. Assuming the allegations are true, Defendants McKesson and FDB inflated the AWP-WAC spread from 20% to 25% on all marked up drugs beginning in late 2001. While the determinants of the WAC reported to FDB did not change for the marked up drugs during this period, the related AWP increased by five percentage points of WAC. As a result, the costs at which providers (the retail pharmacy channel) obtained the drugs (WAC) were unchanged while the basis for reimbursement (AWP) by the Payor Class was increased relative to that provider acquisition cost. Since the Class includes all those and only those payors whose reimbursement rates were determined by the AWP of the marked up drugs and since the Scheme increased those AWP, the reimbursement rates on all transactions subject to the Class definition were inflated relative to the cost at which providers acquired those drugs. This five percent inflation is the basis for causation, injury and damages on a class-wide basis.

I have analyzed whether there exist standard formulaic methodologies to demonstrate the existence of and measure the extent of class-wide injury and damages. I conclude and demonstrate that such formulaic methodologies do exist; the methodologies make use of standard economic analysis and existing data sources. I demonstrate that the measure of damages is directly related to the reimbursement rates paid by Class members that were increased by the 5% inflation of the AWP. Based on the number of drugs involved in the Scheme, I conclude that damages are substantial.

This Declaration proceeds as follows. In Section I, I present my qualifications. In Section II, I identify the Class and review the allegations. I conclude that, if the allegations are proven true, the Class suffered Class-wide injury, the Class was damaged economically in the form of overcharges for drug reimbursements and those damages can be calculated on an aggregate Class-wide basis. In Section III, I present in detail the formulaic methodology that I will use to calculate Class-wide damages.

I. Qualifications

1. My name is Raymond S. Hartman. I am Director and President of Greylock McKinnon Associates (GMA), an economic consulting and litigation support firm located in Cambridge, Massachusetts.

2. As I have discussed in prior testimony before this Court, I am an economist specializing in microeconomics, econometrics and the study of industrial organization. I have taught economics, conducted economic research and provided economic consulting in my areas of specialization for thirty years. I taught economics as an Assistant Professor and Associate Professor within the Department of Economics at Boston University over the period 1977-1988. I taught economics as a Visiting Associate

Professor and member of the Visiting Faculty at the School of Law, Boalt Hall, University of California at Berkeley over the period 1988-1993. I was a member of the research faculty at MIT over the period 1977-1982. Over the entire period since 1971, I have consulted to federal and state governmental bodies, private corporations, law firms, consulting companies, research organizations and international lending organizations. I have been a research referee for a variety of academic journals. I am the author of more than 100 refereed journal articles, book chapters and research/consulting reports.

3. I have submitted oral and written testimony before federal and state courts of law and regulatory commissions. My testimony as an expert witness has addressed anticompetitive behavior, merger efficiencies, breach of contract, employment discrimination, patent infringement, class certification and the estimation of damages in a variety of markets and industries including, but not limited to, the pharmaceutical industry, the health care services industry, the electric power industry, the banking industry, the copper industry, the defense industry, the cable TV industry, the tobacco industry, the electrical and mechanical carbon products industry, the medical devices industry and the construction industry. I have consulted in litigation involving a broader array of markets and industries.

4. I received a bachelor's degree in economics (*magna cum laude*) from Princeton University in 1969. I received a master's degree in economics from MIT in 1971 and a Ph.D. in economics from MIT in 1977. My Curriculum Vita is attached to provide specific and recent biographical and professional information (see Attachment A.1). Attachment A.2 identifies my recent testimony at deposition and trial. In this matter, Greylock McKinnon Associates is being compensated for my time at the rate of \$450.00 per hour.

II. Purpose, Overview and Summary of My Analysis

A. The Scope and Purpose of My Retention

5. I have been retained by Counsel to the named Plaintiffs and the Class in this matter.¹ The Class (named the *AWP McKesson/First Data Class*) consists of

“Consumer purchasers:

All individual persons who paid, or incurred a debt enforceable at the time of judgment in this case to pay, a percentage co-payment for the Marked Up Drugs during the Class Period pursuant to a plan, which in turn reimbursed the cost of brand-name pharmaceutical drugs based on AWP. The Marked Up Drugs are

¹ *New England Carpenters Health Benefits Fund; Pirelli Armstrong Retiree Medical Benefits Trust; Teamsters Health & Welfare Fund of Philadelphia and Vicinity; and Philadelphia Federation of Teachers Health and Welfare Fund, District Council 37, AFSCME - Health & Security Plan; June Swan; Maureen Cowie And Bernard Gorter v. First Databank, Inc., and McKesson Corporation*, United States District Court District of Massachusetts, C.A. No. 1:05-CV-11148-PBS.

all drugs identified in Exhibit A to the Second Amended Complaint and consist of certain brand-name drugs only.²

Third-party Payors:

All third party payors whose pharmaceutical payments for the Marked Up Drugs were based on AWP during the Class Period. The Marked Up Drugs are all drugs identified in Exhibit A and consist of brand-name drugs only.³

Excluded from the above-listed Classes are: (a) each defendant and any entity in which any defendant has a controlling interest, and their legal representatives, officers, directors, assignees and successors; (b) any co-conspirators; and (c) any governmental entities who purchased such drugs during the Class Period.

The Class Period is August 1, 2001 to March 15, 2005, when First Data disclosed that it had stopped surveying wholesalers.”

Excluded from the Class are: (a) each defendant and any entity in which any defendant has a controlling interest, and their legal representatives, officers, directors, assignees and successors; (b) any co-conspirators; and (c) any governmental entities who purchased such drugs during the Class Period. The Class Period is August 1, 2001 to March 15, 2005, when First Data disclosed that it had stopped surveying wholesalers.”⁴

6. I have been asked by Counsel to evaluate the effects Defendants’ activities (if proven as alleged in the *Complaint*) had on the members of the Class. I have been asked to analyze whether causation, liability and injury can be proven on a class-wide basis. I have been asked to evaluate whether aggregate injury to the Class can be measured and to identify possible formulaic methods for that measurement.

Since discovery and my analysis and calculations are ongoing, I reserve the right to supplement the opinions put forward in this Declaration as I receive additional data and information. In rendering my determinations, I have relied upon the materials

² Plaintiffs reserve the right to modify the Class Definition based on class related discovery and/or merits discovery.

³ Plaintiffs reserve the right to modify the Class Definition based on class related discovery and/or merits discovery.

⁴ Second Amended Class Action Complaint, *New England Carpenters Health Benefits Fund, et al. v. First DataBank, et al.*, October 31, 2006 (hereafter *Complaint*), ¶¶ 153 & 154. The exact dates for the Class Period may be refined based upon discovery. The drugs subject to this *Complaint* are presented in Exhibit A to the *Complaint*; Plaintiffs reserve the right to modify the number of drugs and the Class Definition based upon class-related discovery and/or merits discovery.

I have been advised by Counsel that the Class definition may be expanded to include AWP’s published by either First DataBank (FDB) or MediSpan. This change in class definition would not alter my proposed methodologies or the conclusions I present in this Declaration. For purposes of this Declaration, any reference to AWP’s published by FDB should be assumed to include those related AWP’s published by MediSpan, if the Class definition is expanded in this fashion.

identified in Attachment B of this report. The materials relied upon are the types of materials reasonably relied upon by experts in my field in forming opinions and drawing inferences on a subject.

B. The Allegations

7. The allegations in this matter are straightforward and simply framed. Defendants McKesson Corporation (McKesson) and First DataBank (FDB) are alleged to have recognized and wrongfully exploited the relationship between *the two most important list prices* in pharmaceutical markets – the AWP and the WAC. These list prices are the bases for most transaction prices in this market.

8. As recognized by this Court, the AWP has been and continues to be an important basis for drug reimbursement in this market.⁵ For branded self-administered drugs, which are the only drugs included in the proposed class, the AWP is **the** basis for reimbursement. By definition, the Class will therefore include those branded self-administered drugs for which the reimbursement rate was determined by reference to the AWP published by FDB.

9. For the drugs subject to the Class definition, the AWP determines the amount paid to providers (retail pharmacies and other retailers) and the related WAC determines the cost of the pharmaceutical goods sold by those providers. The spread between AWP and WAC (or AWP – WAC) determines the profitability to retailers of providing specific drug products.⁶ Changes in the spread will change retailer profitability, everything else equal. Increases in the spread will increase retailer profitability.

10. The AWP and WAC therefore are important market signals for innovator drug companies. Drug manufacturers analyze and identify the AWP, WAC and the related spread (AWP – WAC) deemed optimal for their drug products. Those AWP, WACs and/or spreads are reported to the three market price compendia (FDB, MediSpan and

⁵ In her Memorandum and Order re: Motion for Class Certification (hereafter *Memorandum and Order*), *In re: Pharmaceutical Industry Average Wholesale Price Litigation*, United States District Court District of Massachusetts, MDL No. 1456, Civil Action No. 01-12257, August 16, 2005, Judge Saris states (at p. 7), “Throughout the class period, from 1991 to the present, AWP has been the pricing benchmark for most pharmaceutical sales in the United States. (Hartman Decl. Attach. D ¶¶ 29-30; Schondelmeyer ¶ 36.)” In forming her opinion, Judge Saris relied upon Professor Ernst Berndt, who noted in his February 9, 2005 Report: “AWP has served as a reference or focal point, an industry standard for baseline reimbursement, and as such a fictional benchmark price from which discounts are frequently specified, directly or indirectly” (¶ 16); and “Recall that pharmacies are typically reimbursed by health plans/insurers/PBMs for drugs they dispense on the basis of a relatively simple formula, such as AWP - X% plus dispensing fee plus (occasionally) administrative fees. ... [A]lmost all single source brand drugs are contractually reimbursed using AWP” (at ¶¶ 49 & 55). Ernst R. Berndt, Report of Independent Expert Professor Ernst R. Berndt to Judge Patti B. Saris, *In Re Pharmaceutical Industry Average Wholesale Price Litigation*, MDL No. 1456, Civil Action No. 01-12257-PBS, February 9, 2005 (hereafter “Berndt Report”).

⁶ Note that the designation “*Spread*” in this matter refers to the difference between the two manufacturer list prices, AWP and WAC. This meaning differs from that used in the MDL AWP litigation, where the designation “*Spread*” refers to the difference between AWP and ASP. Both differences are spreads; their definitions are adapted to and appropriate for the allegations at issue.

RedBook). Historically, manufacturers have been characterized as having specific AWP –WAC spreads (20%, 25%, other).

11. Defendants McKesson and FDB are alleged to have conspired to wrongfully increase the spread between the AWP and WACs reported by FDB for certain drug products from 20% to 25%. This alleged act has been called by Plaintiffs the “Five Percent Spread Scheme” or simply the “Scheme,” and the drugs impacted by the Scheme will be referred to as the marked up drugs.⁷

C. The Effects of the Alleged Scheme

12. If the allegations put forward in the *Complaint* are true, as a matter of basic economics and the business practices of pharmaceutical markets, the following economic events and results occurred:

- a) Those AWP reported by FDB, which were related to their WACs by a spread of 20% prior to the implementation of the Scheme, were increased relative to their WACs by 5 percentage points to a spread of 25% as a result of the Scheme.
- b) Where reimbursement rates (allowed amount or AA) paid by Class members were determined formulaically by AWP as $AA = \{\text{“AWP less } x\%” \text{ plus a dispensing fee}\}$, the reimbursement rates were increased for those drugs, relative to the acquisition costs of the providers (which continued to be related to the WACs).
- c) The amounts paid by all or substantially all Class members for the relevant pharmaceuticals were inflated.⁸

D. The Impact of the Alleged Scheme Can and Should be Analyzed on a Class-wide Basis

13. Assuming the allegations of the *Complaint* are proven true and focusing upon the brand-name self-administered drugs identified in Appendix A,⁹ I conclude the following.

- a) In late 2001 or early 2002, Defendants conspired to alter the historical relationship between the two most important list prices used by innovator drug

⁷ *Complaint*, ¶ 10.

⁸ As stated in ¶¶ 109 and 110 of the *Complaint*,

“... one manufacturer has stated, that ‘the AWP-WAC spread is the primary determinant of the end retail pricing of prescription drugs. As a result, changes in the spread will have a direct impact on retailer profitability as well as drug expenses for not only consumers but even more uniformly for health insurers and other third party payors.’”

“Another industry insider stated: Payors currently use AWP or average wholesale price as a basis for reimbursing retail pharmacy for providing RX’s to patients with insurance and by retail pharmacy as a basis for pricing cash prescriptions. Pharmacy reimbursement – a higher spread translates into higher reimbursement to retailers and mail order pharmacies. The usual reimbursement formula for private third party Medicaid RX’s in [*sic* – is] anchored off of AWP – so a higher markup will increase the reimbursement level at least in the short term.”

⁹ The drugs listed in Appendix A to the *Complaint* are limited to brand-name self-administered drugs.

manufacturers. Specifically, they conspired to raise “the WAC-to-AWP spread to 25% for over four hundred brand-name drugs that previously had received only the 20% markup amount.” They effectuated the Scheme over the period 2002-2003. Once effectuated, the 25% spread has remained in place to this day.¹⁰

- b) The determinants of WAC are not alleged to have been altered by the conspiracy.¹¹ Hence, the costs at which providers (the retail pharmacy channel¹²) obtained the drugs were unchanged by the alleged conspiracy. However, relative to the provider acquisition cost, the AWP was increased.

14. The impact of the Scheme was Class-wide and uniform.

- a) Since its merger with MediSpan and certainly since August 2001, FDB was *the single source* (according to the FTC, “a monopolist”) for comprehensive, electronic integrateable drug price information for the pharmaceutical industry. FDB could use its position as a monopolist to raise the spread between AWP and WAC.¹³
- b) Because FDB was the single source of comprehensive, electronic integrateable drug price information, it was the source of AWP information for all or substantially all major market intermediaries (e.g., PBMs), retail providers and institutional payors (e.g., insurers) serving the Class.
- c) Since the Class includes all those and only those payors whose reimbursement rates were determined by AWP and since the Scheme increased those AWP, the reimbursement rates on all transactions subject to the Class definition were inflated.
- d) The impact was uniform across Class members: ***the AWP were increased.*** Those AWP were incorporated into the calculation of reimbursement rates for all Class members. AWP for the marked up drugs are published industry-wide and

¹⁰ *Complaint*, ¶¶ 8-11.

¹¹ The WAC is also known as the Direct Price (DP), catalog price, wholesale net price or book price; see *Complaint*, ¶ 37.

¹² See ¶¶ 54-58 of the *Complaint*.

¹³ FDB’s market power allowed it to raise price; see ¶¶ 37-38 of the Federal Trade Commission Complaint (Complaint for Permanent Injunction and Other Equitable Relief Pursuant to Section 7A(g)(2) of the Clayton Act and Section 13(b) of the Federal Trade Commission Act, *Federal Trade Commission v. The Hearst Trust, The Hearst Corporation and First Databank, Inc.*, United States District Court for the District of Columbia, Civ. No. 1:01CV00734) (hereafter *FTC Complaint*) discussed below in the text at ¶ 17. Its market power allowed it to impose the alleged Scheme upon manufacturers; see ¶ 145 of the *Complaint*, which states “in 2003 one manufacturer indicated that it would ‘no longer report average wholesale prices (AWP) for its products [because of the Scheme]’, First Data reported to McKesson that this manufacturer appeared ‘to be playing hard ball and [First Data] just won’t play.’ First Data indicated that it would, then, ‘just assume the markup is 1.25.’ In this situation, when the manufacturer wanted to be assured that any disclosure of an AWP associated with its product was a price that ‘has not been authorized’ by it, First Data wrote back stating: ‘Wonderful. If we don’t report an AWP, the NDC will not be listed. It is the rules of the database. That database does not allow for statements such as your attorneys wrote below.’”

do not vary across segments of the industry. As a result, individual issues concerning variation in the information content of FDB's AWP's for particular drugs do not arise.

15. Class-wide analysis is feasible and the most effective way of demonstrating impact, corroborating liability and measuring damages.

- a) The impact of the Scheme upon Class members was increased reimbursement rates. For a given drug and payor, retailers or PBMs billed or charged Class members at $(AWP - x\% + df)$, where x is the percentage off AWP and df is the dispensing fee. While $x\%$ and df may vary somewhat among Class members, the fact that AWP was inflated implied that the reimbursement rate or amount allowed (AA) was higher than it would have been absent the Scheme for all Class transactions.
- b) Existing data sources and analytic methods can be used to identify the fact that Defendants' conduct and conspiracy led to economic impact to the Class.
 - The results of a preliminary review of FDB's list prices (AWPs and WACs) have already been described in the *Complaint*, in aggregate and for specific drugs and drug manufacturers.¹⁴ The resulting increases in the spreads have been documented in aggregate.¹⁵ I reproduce that analysis for the single-source self-administered drugs at issue in this matter in Figure 1 below.
 - This increase can be documented for all relevant drugs (by NDC) using readily available FDB data. Indeed, I have already analyzed much of the necessary FDB data.
 - The observed clustering of spread increases during 2001-2002 is consistent with and supportive of the allegations of conspiracy in this matter. It is unlikely that it reflects the aggregate decisions of independent innovator drug companies, many of which were therapeutic competitors and some of which resisted retailer pressures to increase the spread.¹⁶
- c) Existing data sources and analytic methods can be used to measure the degree to which Defendants' conduct and conspiracy led to Class-wide aggregate economic injury.
 - FDB data provides the AWP's of all brand-name drugs subject to the Scheme. Once the date at which the Scheme inflated the AWP's of specific drugs (by NDC) is determined, aggregate impact can be calculated.
 - Denoting the average reimbursement rate for a given NDC in a given period as $AA = \{AWP - x\% + df\} = (100\% - x\%)AWP + df$, and denoting the increase in the AWP as ΔAWP , the increase in the reimbursement rate is $\Delta AA = (100\% - x\%) \Delta AWP$.

¹⁴ See *Complaint*, ¶¶ 10, 17, 129-131.

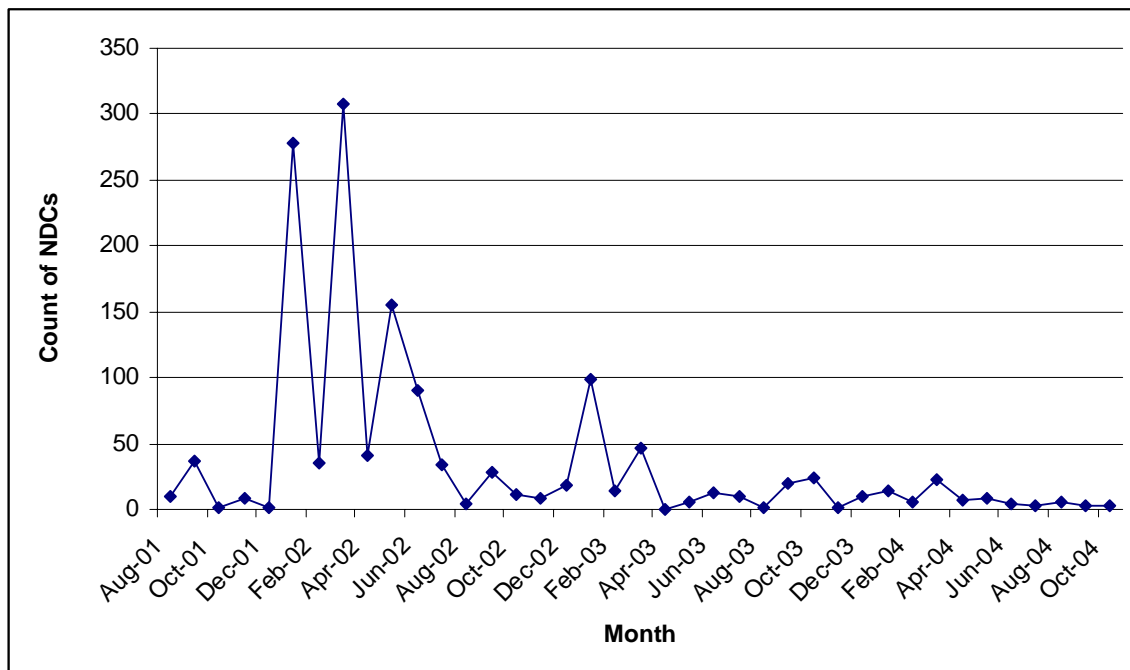
¹⁵ See ¶ 10 of the *Complaint*.

¹⁶ Indeed, I understand that, in order to avoid detection and adverse manufacturer response, the Scheme was often effectuated at those times when a drug manufacturer reported increases in WAC to FDB and did not monitor carefully enough the changes in the spread that were imposed with the concomitant publication of increased WAC and AWP. See ¶ 139 of the *Complaint*.

If and when the Scheme was observed and contested by the manufacturer, I understand that the FDB had sufficient market power to defeat such objections; see ¶ 148 of the *Complaint*.

- This increase in reimbursement rates paid by Class members is attributable to all Class purchases by NDC.
- That number of units or scripts distributed to and reimbursed by Class members can be calculated using standard industry data sources. Total units/scripts produced and sold can be calculated from manufacturer data summarizing extended units/scripts produced and sold by NDC during the Class Period. Alternative, more-easily accessible sources of industry-wide survey data on total retail sales are Verispan and IMS. Such data are available from these vendors directly or indirectly through business entities which purchase and use data. Indeed, since Defendant McKesson and other wholesalers are major contributors of data to IMS, it is possible if not likely that the IMS data can be obtained from McKesson. Alternatively, the source data that McKesson provides to IMS with which IMS infers total market sales may be a useful basis measuring total market sales/scripts filled.
- Having measured total extended units/scripts reimbursed at retail, that portion reimbursed at allowed amounts calculated with reference to FDB AWP can be calculated using standard survey instruments and survey information described in more detail below.
- The effect, if any, of the Scheme upon rebates paid to the Class and the resulting changes in those rebate payments that would occur absent the Scheme can be analyzed and measured.

Figure 1
Number of NDCs with Spread Change from 20% to 25%
August 2001 through October 2004



- d) The analysis and measurement of damages can and should be conducted class-wide.
- The source of data to measure the inflation or overcharge implied by the Scheme is the same for all Class members – the FDB.
 - The sources of data for aggregate Class purchases is the same for all Class members – market-wide sales from manufacturers or market-data vendors (IMS, Verispan, perhaps others).
 - Survey methods exist to identify and sample a sufficient set of market entities to calculate that portion of total scripts filled by period for which the reimbursement was determined by the FDB AWP.
- e) There exists a standard formulaic methodology by which Class-wide damages can be calculated, which uses the data described above. The methodology is analogous to methodologies used to calculate the impact of price increases in a variety of contexts. For examples, such methodologies are used to calculate damages arising from illegal price increases generally;¹⁷ to calculate damages in antitrust litigation, particularly recent pharmaceutical litigation;¹⁸ to calculate damages in litigation related to the manipulation of the AWP;¹⁹ and to analyze revenue changes from strategic price changes by producers in the pharmaceutical industry specifically and in all industries generally.

III. Analysis

A. Industry Reliance upon FDB AWP Data

16. Class definition and Class membership is straightforward and unequivocal. It is determined simply by reference to the AWP in the reimbursement formulae used for specific transactions by third party payors (TPPs), consumers, PBMs and retailers.

17. Given the recent trend to computerized calculation and processing of drug claims, accessible and easily interactive AWP data bases are crucial to efficient claims

¹⁷ Federal Judicial Center, *Reference Manual on Scientific Evidence*, 1994; see Daniel L. Rubinfeld, “Reference Guide on Multiple Regression,” pp. 417-469 and Robert E. Hall and Victoria A. Lazear, “Reference Guide on Estimation of Economic Losses in Damages Awards,” pp. 471-523.

¹⁸ I have implemented such methods in the following matters: *In the Matter of Hoechst Marion Roussel, Inc., Carderm Capital L.P., and Andrx Corporation*, Docket No. 9293, United States of America Before Federal Trade Commission; *In re Terazosin Hydrochloride Antitrust Litigation*, Case No. 99-MDL-1317 Seitz/Garber, United States District Court for the Southern District of Florida; *In re Ciprofloxacin Hydrochloride Antitrust Litigation*, Master File No. 1:00-MD-1383, United States District Court for the Eastern District of New York. See also Daniel L. Rubinfeld and Peter O. Steiner, “Quantitative Methods in Antitrust Litigation,” *Law and Contemporary Problems*, 46(4), Autumn 1983; and Judge Edmund’s decision in certifying class *In re: Cardizem CD Antitrust Litigation*, Master File No. 99-MD-1278, 200 F.R.D. 326 (E.D. Mich. 2001).

¹⁹ As stated by this Court in the *Memorandum and Order*, ¶¶ 14-16 & 57-60. See also my Declarations in the matter *In re: Lupron Marketing and Sales Practices Litigation*, United States District Court, District of Massachusetts, MDL No. 1430, CA No. 01-CV-10861.

administration.²⁰ FDB has been recognized as offering the best data base with those characteristics, and reliance upon FDB AWP data became standard practice by the end of the 1990s. These facts have been recognized by the Federal Trade Commission (FTC)²¹ in their recent forced divestiture of MediSpan from FDB.

- a) For the four years prior to the Class Period, FDB and MediSpan were integrated and operated as a single entity, given the fact that the Hearst Corporation, owner of FDB, had acquired MediSpan through the acquisition of all capital stock of J.B. Laughery, Inc., on or about January 15, 1998.
- b) According to the FTC,²² “[t]he principal products sold by ... FDB ... and ... Medi-Span prior to the Acquisition and Medi-Span’s integration into Defendant FDB, are comprehensive, integratable drug information databases (hereinafter ‘integratable drug data files’). These are electronic databases containing comprehensive clinical, pricing, and other information on prescription and non-prescription medicines. Integratable drug data files are uniquely capable of being readily integrated with other computerized information systems to help physicians, pharmacists, and others quickly obtain information important to decisions regarding the prescription, dispensing, and purchase of medicines. ... Drug information in other forms is not an adequate substitute for the provision of such information through integratable drug data files.”

As a result of the acquisition, FDB was “the sole provider of comprehensive, integrateable electronic data files providing AWP information throughout the retail pharmacy distribution chain, including most private third-party payors.”²³ Of

²⁰ As noted by Professor Ernst Berndt in his paper, “The U.S. Pharmaceutical Industry: Why Major Growth in Times of Cost Containment?” *Health Affairs*, 20(2), 2001: “Recent technological progress, particularly involving information technology and telecommunications equipment, has dramatically changed the way in which third-party drug claims are processed at pharmacies, making covered insurance transactions much more convenient and less costly than they were a decade ago. Today, for example, the privately insured beneficiary usually pays a copayment or coinsurance to the pharmacy upon receipt of the prescription. After monitoring the pharmacy claim request to ensure compliance with formulary provisions, the third-party insurer then seamlessly reimburses the pharmacy electronically for the remainder, based on their contractual arrangement. For publicly provided drug insurance such as Medicaid, even when there is a copayment, the entire transaction is typically processed instantaneously and electronically. Technological developments involving electronic transactions have also facilitated inexpensive, instantaneous monitoring for safety and formulary compliance by PBMs.”

These “technological developments” would not be possible without a comprehensive and interactive electronic data base for AWP. FDB provides this comprehensive and interactive electronic data base.

²¹ *FTC Complaint*. The background for and discussion of this merger and the FTC’s requirement for divestiture are discussed in the *Complaint* at ¶¶ 84-98.

²² *FTC Complaint*, ¶¶ 12-13.

²³ According to the FTC (*ibid*, ¶¶ 35-38), “Until the Acquisition, Defendant FDB and Medi-Span were substantial, direct competitors within the relevant market of integratable drug data files in the United States, and faced little or no competition from other firms. Competition between Defendant FDB and Medi-Span was strong, vigorous, helped hold down prices, promoted product improvements, and improved the quality of service. After the Acquisition, and to this day, Defendant FDB held and holds a monopoly or near monopoly in the relevant market, [and] ... there remains little or no competition to Defendant FDB in the relevant market.”

course, when marketing its products, First Data made this known stating that it ‘provides you the same AWP prices used by Aetna, PAID PCS, MEDI, MET, most Blue Cross Blue Shield Plans, wholesalers and approximately 49 Medicaid programs’” (*Complaint*, ¶ 107).

- c) Given the FTC’s finding of monopoly or near-monopoly power by FDB in its relevant market (see also footnote 21 above), the FTC ordered FDB to divest itself of MediSpan as of December 19, 2001.²⁴ While this divestiture began to cure the problem of monopolization it did not cure the effects of the Scheme.
 - MediSpan’s calculations of AWP and the spread from WAC were inherited from FDB and their reported AWP and spreads were identical²⁵
 - A preliminary review of the MediSpan AWP data for the NDCs considered in this matter confirms that substantially all of the AWP were identical to those published by FDB.²⁶

B. The Formulaic Methodology for Calculating Aggregate Class-Wide Damages

18. Given the pervasive market reliance upon FDB price data noted by the FTC, it would be reasonable to infer that the AWP for those drugs (delineated by NDC) affected by the Scheme would have been the basis for increases in the reimbursement rates paid for all or substantially all units manufactured and sold during the Class Period. This inference can and will be verified as part of the damage analysis conducted using the methods described in the next paragraphs.

19. In order to calculate aggregate Class-wide damages, one must calculate the extent to which the Scheme increased Class member reimbursement rates per transaction and the number of transactions subject to the Class definition. These calculations are standard and completed using readily available data, as discussed briefly in Section II above.

20. The extent to which the AWP were increased by the Scheme is calculated by NDC as follows.

- a) Denote the wholesale acquisition cost (or its equivalent) reported by the manufacturer to FDB as WAC. The manufacturer’s determination of WAC is unaffected by the Scheme.

²⁴ See Manufacturers Divestiture Notice, http://www.medispans.com/Products/MFG_divestiture_notice.aspx as accessed June 29, 2006.

²⁵ I have been informed by Counsel that the Consent Decree entered in November 2001, required FDB to sell the MediSpan business to Facts and Comparisons. The Decree required that FDB provide Facts and Comparisons with all FDB price information until Facts and Comparisons was able to develop its own production system.

²⁶ The analysis was done for 2002 and a portion of 2003. We did not have MediSpan data beyond that time.

- b) Denote AWP^{pre} as the pre-Scheme AWP and AWP^{post} as the post-Scheme AWP. Note that $(AWP^{pre} - WAC)/WAC = 0.20$ and that $(AWP^{post} - WAC)/WAC = 0.25$. Note also that all three prices are readily found in the FDB data.
- c) Hence $AWP^{pre} = 1.20 * WAC$; $AWP^{post} = 1.25 * WAC$; $\Delta AWP = AWP^{post} - AWP^{pre} = (1.25 - 1.20) * WAC = 0.05 * WAC$; and $\Delta AWP / AWP^{pre} = 0.05 * WAC / 1.20 * WAC = 4.16666\%$, which I round to 4.2%.
- d) Hence, the Scheme increased AWP by 4.2% for every relevant NDC.²⁷

21. The extent to which the reimbursement rates (AAs) were increased by the Scheme is calculated by NDC as follows.

- a) The formula for reimbursement for brand-name self-administered drugs is well-known to be $AA^{pre} = \{AWP^{pre} - x\% + df\} = \{(100\% - x\%) * AWP^{pre} + df\} = p * AWP^{pre} + df$, where $x\%$ and df have been described above and $p = (100 - x)$, which is expressed as $0 < p < 1$.²⁸
- b) $AA^{post} = p * AWP^{post} + df$; p and df remain unaffected by the Scheme.
- c) $AA^{post} - AA^{pre} = \Delta AA = p * \Delta AWP = p * 0.05 * WAC$.
- d) $\Delta AA / AA^{pre} = p * 0.05 * WAC / (p * 1.20 * WAC + df) < p * 0.05 * WAC / p * 1.20 * WAC = 4.2\%$, if the allowed amount is assumed to include the dispensing fee. If the allowed amount includes the ingredient cost alone, $\Delta AA / AA^{pre} = 4.2\%$.
- e) Hence, the Scheme increased the allowed amount reimbursed by NDC by less than 4.2%, the percentage increase in the AWP. If the dispensing fee is relatively small relative to AWP, the increase in reimbursement rates is approximately the same as the increase in AWP, 4.2%. If the dispensing fee is not included in the allowed amount, the increase is 4.2%.
- f) It is well recognized by testimony before this Court that for brand-name self-administered drugs, $0.13 < x < 0.18$.²⁹ Assuming on average $x = 0.15$, $p = 0.85$. Therefore, averaged over all transactions by NDC, $\Delta AA = 0.85 * 0.05 * WAC = 0.0425 * WAC$.
- g) ΔAA can be calculated in terms of the AWP or WACs reported by FDB.

²⁷ Note that a small sub-set of the NDCs listed in Appendix A experienced an increase in spread greater than the typical 5%. For these particular NDCs, the pre-Scheme spread was less than 20%, but was then increased to 25% post-Scheme (see, for example, Biaxin in the *Complaint*, ¶ 129). The methodologies presented in this Declaration can easily incorporate these NDCs into the damage calculations.

²⁸ Extensive testimony supporting this formulation has been presented to this Court by Experts for drug manufacturers and by Professor Berndt (see ¶¶ 15 and 49, Berndt Report, *op cit.*)

²⁹ Judge Saris, *Memorandum and Order*, at page 24 states, “It is important for the manufacturer to sell to the wholesaler at a price that allows both for the wholesaler’s take (usually 2%) and for the pharmacy to earn a profit from selling to TPPs and consumers at AWP minus 13% to 18%. (Berndt Report, ¶¶ 22, 24-27.)” *Emphasis added*. Both Mr. Young (Defendants’ expert) and I concur, see ¶ 42 of my December 16, 2004 Declaration.

22. Using industry-wide information from manufacturers, industry data sources (IMS, Verispan or other) and/or from McKesson data (see ¶ 14.c), I can calculate total units of any NDC prescribed, distributed and reimbursed for all drugs subject to this litigation by time period. Denote that total as Q. If 100% of a given drug produced and prescribed is reimbursed by the Class at rates determined by the FDB AWP, aggregate “gross” overcharge damages are calculated by NDC as

$$(1a) \quad \text{Damages}^g = \Delta AA * Q.$$

Given FDB’s monopoly cited by the FTC and given the continued use of the FDB data post divestiture by Facts and Comparison, it is likely that 100% or nearly 100% of all units of a given NDC subject to this litigation were reimbursed based upon the FDB AWP (subject to the caveats discussed in the next paragraph) and subject to the gross damage calculation in Equation (1a). Alternative variations of Equation (1a) are possible, depending upon the mix of FDB and IMS data used in the damage calculation.

23. The issue of rebates, which arose in the AWP litigation does not affect a finding of liability here. Here the fact of Class-wide impact and injury is determined directly by the Scheme.

24. While unlikely, the size of the damages induced by the impact and injury could be affected by rebate payments. If I am asked to account for any possible changes in rebates that have occurred as a result of the Scheme and net against the damage calculation any reduction in those rebate payments had the Scheme not occurred, this can be done on a class wide formulaic basis. I would proceed as follows.

Rebate payments are determined by a variety of factors.³⁰ To the extent that the Scheme had an effect on those factors, rebates may have increased with the Scheme. For example,

- a) If the Scheme increased the quantity of a relevant drug prescribed relative to therapeutic competitors not subject to the Scheme, rebates would have increased as a result of the Scheme, *if* rebates were calculated on a market share basis.
- b) If total units of a relevant drug prescribed and sold increased as a result of the Scheme, rebates would have increased as a result of the Scheme, *if* rebates were calculated on a total sales basis.
- c) If total units of a relevant drug were given more advantageous formulary placement as a result of the Scheme, formulary access rebates would have increased, *if* formulary rebates were paid.

25. The Scheme was effectuated by FDB and McKesson. The Scheme was advocated by retailers. The Scheme was at times resisted by manufacturers, and therefore was unlikely to offer the manufacturer benefits (discussed in the preceding paragraph) for which manufacturers paid rebates. Indeed, if the Scheme would have benefited the relevant manufacturers, they would have increased the spread to 25% on their own. I

³⁰ For example, market share rebates; formulary access rebates; total sales rebates.

therefore see no obvious reason to conclude that the Scheme benefited manufacturers and increased rebate payments paid to Class members.

To the extent that rebates are determined as a percentage of manufacturer revenue, rebates are unaffected by the Scheme.³¹ To the extent that rebates are determined as a percentage of WAC, rebates are unaffected by the Scheme.³²

However, for my analysis I make the *most conservative* assumptions (in favor of Defendants) regarding rebate payments and credits. Specifically, I assume

- a) All rebate payments are related to and determined *solely by total sales*. Market share rebates, formulary access rebates and any other rebates *are not paid*.
- b) Total manufacturer sales are booked at list price (i.e., AWP, which is not standard business or accounting practice) rather than net sales price (i.e., ASP, which is standard business and accounting practice).
- c) All rebates paid are distributed to the TPPs whose reimbursement rates have been inflated by the Scheme; no portion of the rebates is retained by the PBMs through which the drugs are distributed.
- d) Total rebates paid amount to approximately 5% of AWP.³³
- e) Under these extreme assumptions, incremental rebates earned as a result of the Scheme are $5\% \cdot (AWP^{\text{post}} - AWP^{\text{pre}}) = 0.05 \cdot (AWP^{\text{post}} - AWP^{\text{pre}}) = 0.05 \cdot (1.25 - 1.20) \cdot WAC = 0.0025 \cdot WAC$.
- f) The increased reimbursement paid as a result of the Scheme is $\Delta AA = 0.85 \cdot 0.05 \cdot WAC = 0.0425 \cdot WAC$ per unit reimbursed (§ 21.f above). Under the extreme assumptions regarding rebates developed above, for every unit incremental rebates are $0.0025 \cdot WAC$, or approximately 6% of the overcharge.³⁴

If adjusted Class damages are calculated as Equation (1a) above and if rebates are increased by the Scheme to the extent implied by the assumptions above,

$$(1b) \quad \text{Damages}^{\text{fully-adjusted-tp}} = 94\% \cdot \Delta AA \cdot Q.$$

This measure of damages is extremely conservative.

³¹ ASPs are not alleged to change as a result of the Scheme. While I have observed rebates = 5-8% of *net sales* for branded self-administered drugs (see § 30) of my September 3, 2004 Declaration in Support of Class Certification in the MDL AWP litigation), since ASPs do not change with the Scheme, rebates paid per unit sold are 5-8% of ASP *in both* the actual and but-for worlds. Hence, no correction for rebates is necessary.

³² WAC is not alleged to change as a result of the Scheme. While I have observed rebates $\approx 6\%$ of WAC (see § 30.b) of my September 3, 2004 Declaration in Support of Class Certification in the MDL AWP litigation), since WACs do not change with the Scheme, rebates paid per unit sold are 6% of WAC *in both* the actual and but-for worlds. Hence, no correction for rebates is necessary.

³³ This assumption follows from the previous two footnotes; see *ibid*.

³⁴ That is, incremental rebates relative to inflated reimbursement rates = $0.0025 \cdot WAC / 0.0425 \cdot WAC = 5.9\%$.

I declare that this declaration is true and correct.

/s/ Raymond S. Hartman

Raymond S. Hartman
Executed on December 20, 2006

Attachment A.1
Curriculum Vita

November 2006

Raymond S. Hartman
Curriculum Vita

Date of Birth: 3/31/47

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DEGREES

B.A. (MAGNA CUM LAUDE) Princeton University 1969
M.S. Massachusetts Institute of Technology 1971
Ph.D. Massachusetts Institute of Technology 1977

Ph.D. DISSERTATION

An Oligopolistic Pricing Model of the U.S. Copper Industry (MIT, 1977)

HONORS, SCHOLARSHIPS, AND FELLOWSHIPS

1969-71 National Science Foundation Fellowship to MIT
1965-69 Alfred P. Sloan Scholarship to Princeton
1969 Woodrow Wilson Fellowship Honorable Mention
1965 National Merit Scholarship Finalist

RESEARCH AND TEACHING INTERESTS

Econometrics/Statistics
The Economics of Regulated Industries
Energy and Environmental Economics
Microeconomics
Industrial Organization
Law and Economics

POSITIONS

1967-1969	Research Staff, Financial Research Center and Center for Economic Research, Princeton University
1970	Research Staff, Board of Governors, Federal Reserve Board, Washington, DC
1972-1992	Consultant and Staff Economist, Arthur D. Little, Inc.
1977-1984	Research Faculty, Massachusetts Institute of Technology
1977-1983	Assistant Professor, Department of Economics, Boston University
1983-1989	Associate Professor, Department of Economics, Boston University
1983-1988	Principal & Academic Principal, The Analysis Group
1988-1993	Visiting Associate Professor/Visiting Faculty, Boalt School of Law, University of California, Berkeley
1988-1995	Founding Principal, The Law and Economics Consulting Group
1995-1996	Vice President, Charles River Associates
1996-1999	Senior Consultant, Charles River Associates
1996-2000	Director, Cambridge Economics, Inc.
2000-2004	Special Consultant, Lexecon Inc.
1997-	Director and President, Greylock McKinnon Associates

OTHER PROFESSIONAL ACTIVITIES

Research Referee, *Bell/Rand Journal of Economics, Resources Policy, IPC Science and Technology Press, Management Science, Land Economics, Science, Energy Journal, Applied Economics, Econometrica, Review of Economics and Statistics, Journal of Business and Economic Statistics, International Economic Review, Journal of Economics and Management Strategy, Pakistan Journal of Applied Economics, Journal of Health Economics, American Economic Review, Review of Industrial Organization*

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"The Incorporation of Solar Photovoltaics into a Model of Residential Energy Demand," MIT Energy Laboratory Working Paper #MIT-EL 80-014WP, May 1980.

"Consumer Choice Among Alternative Fuels and Appliance Technologies: An Analysis of the Effects of Alternative Energy Conservation Strategies," MIT Energy Laboratory Working Paper #MIT-EL 82-036WP, June 1982.

"Estimation of Hedonic Supply Curves For Residential Water Heaters Using Technical Data and Federal Testing Guidelines," with Alan Cox and Mary Litterman, MIT Energy Laboratory Working Paper #MIT-EL 82-037WP, June 1982.

"A Monte Carlo Examination of the Heckman and the Manski-Lerman Estimators in Discrete/Continuous Models of Demand," October 1986.

"The Value of Service Reliability: Alternative Welfare Measures," with C.K. Woo, October, 1988.

"The Use of Hedonic Analysis in Defining and Measuring Market Size: The Extension of the Merger Guidelines to Heterogeneous Products," Working Paper No. 91-12, Program in Law and Economics. School of Law, Boalt Hall

EXPERIENCE IN CONSULTING AND EXPERT TESTIMONY

Overview of Qualifications

Dr. Hartman is an economist specializing in microeconomics, econometrics and the study of industrial organization. Microeconomics is the science used to analyze and characterize the behavior of groups of consumers and producers that constitute markets. Econometrics is a science that makes use of mathematics and statistics to measure and quantify economic behavior and economic phenomena in markets. The study of industrial organization makes use of both microeconomic theory and econometrics. It focuses upon the structure, conduct and performance of the participants (consumers and producing firms) in markets and industries, for the purposes of predicting behavior and addressing such policy issues as antitrust, regulation and industrial policy.

He has taught economics, conducted economic research and provided economic consulting in his areas of specialization for thirty-five years. He taught economics as an Assistant Professor and Associate Professor within the Department of Economics at Boston University over the period 1977-1988. He taught economics as a Visiting Associate Professor and member of the Visiting Faculty at the School of Law, Boalt Hall, University of California at Berkeley over the period 1988-1993. He was a member of the research faculty at MIT over the period 1977-1982, during which time he conducted research in energy markets for the United States Department of Energy. During the same time, he declined the offer of a Visiting Assistant Professorship within the Department of Applied Economics at MIT, and instead lectured on a selective basis. Since 1971, he has consulted to federal and state governmental bodies, private corporations, law firms, consulting companies, research organizations and international lending organizations. He has been and continues to be a research referee for a variety of academic journals, including the top academic journals in the country. He is the author of more than 100 refereed journal articles, book chapters and research/consulting reports.

He has submitted oral and written testimony before federal and state courts of law and regulatory commissions. His testimony as an expert witness has addressed anticompetitive behavior, merger efficiencies, breach of contract, employment discrimination, patent infringement, class certification and the estimation of damages in a variety of markets and industries including, but not limited to, the pharmaceutical industry, the health care services industry, the electric power industry, the banking industry, the agrochemical industry, the copper industry, the defense industry, the cable TV industry, the tobacco industry, the electrical and mechanical carbon products industry, the medical devices industry and the construction industry. He has consulted to counsel on litigation matters in a broader array of markets.

While his experience has been broadly-based across industries, two industries/markets have been primary subjects of substantial consulting, research and litigation support.

Experience in Energy Markets and Regulated Industries

Since 1977, Dr. Hartman's expertise and experience have involved regulated industries generally and the markets for electric power and natural gas specifically. His consulting and/or litigation assignments have included load forecasting, evaluation of conservation and load management programs, econometric cost analysis, analysis of revenue requirements and rate-making, analysis of value of service reliability, the analysis of mergers and acquisitions, analysis of industry restructuring, analysis of manipulation of spot and future prices in energy markets, and analysis of contract damages arising from DOE's partial breach of the Standard Contract regarding storage of nuclear waste. In these assignments, Dr. Hartman has consulted for such clients as Arizona Public Service, the Pacific Gas and Electric Company, the Southern California Edison Company, the Southern California Gas Company, the San Diego Gas and Electric Company, Portland General Electric Company, Bonneville Power Administration, General Public Utilities, Northeast Utilities, Niagara Mohawk Power Corporation, the Delmarva Power Corporation, Florida Power Corporation, Sithe Energies, the California Energy Commission and Public Utilities Commission, the Missouri Public Service Commission, the Rhode Island Division of Public Utilities, the Attorney General of the State of Massachusetts, the Electric Power Research Institute, the Gas Research Institute, the U.S. Department of Energy, the U.S. Department of Justice, the World Bank, and the governments of Indonesia and Thailand. He has consulted for a number of other clients whose identity must remain confidential.

Experience in Health Care and Pharmaceutical Markets

Over the past 10 years, Dr. Hartman has participated as testifying or consulting expert in a wide array of matters related to health-care markets generally and, more specifically, markets for medical devices and pharmaceutical products. For examples, working with a team of health care experts, he submitted written testimony assessing and measuring the impacts of smoking on Medicaid health care costs in the Commonwealth of Massachusetts. He submitted testimony analyzing the competitive impacts upon and damages to a class of dental laboratories caused by the restrictive dealer practices of a dominant U.S. manufacturer of medical prostheses - false teeth. He consulted to the group of wholesaler defendants in the Brand-Name Prescription Drugs Antitrust Litigation, addressing issues of wholesaler pricing across classes of trade. He consulted to counsel to a manufacturer of cardiovascular stents and other related devices in a variety of patent infringement matters, addressing such issues as competition, market penetration of new products and economic damages arising from patent infringement. He consulted for one group of private plaintiffs in the antitrust matter regarding the prescription drugs lorazepam & clorazepate and for the Federal Trade Commission in the matter of Hoechst Marion Roussel, Inc., Carderm Capital L.P. and Andrx Corporation concerning antitrust claims involving the prescription drug Cardizem CD. That consultation addressed issues of market definition, product competition, class certification and damage estimation. He consulted to counsel on the matter of damages to the class of direct purchasers of the prescription drug Taxol and on the matter of damages to the class of indirect end-payer purchasers of the prescription drugs K-Dur, Augmentin, Bextra, Celebrex and Vioxx. He submitted testimony addressing class certification, liability and/or damages for the class of end-payer purchasers in antitrust or RICO litigation concerning the prescription drugs Hytrin, BuSpar, Relafen, Lupron, Premarin, Cipro in the states of New York and California and in the United States, and Neurontin in the United States and Pennsylvania. In the MDL AWP litigation, he submitted testimony in support of the certification of the class of end-payer purchasers of those pharmaceutical products produced by AstraZeneca, the Bristol-Myers Squibb Group, the Johnson & Johnson Group, the GlaxoSmithKline Group and the Schering Plough Group that were alleged to have been the subject of a scheme to fraudulently inflate their Average Wholesale Price (AWP); he subsequently submitted testimony supporting findings of causation, liability and the calculation of damages for those end-payer groups for which class certification was granted. He has consulted to and/or submitted testimony for the Offices of the Attorneys General for the states of New York, Connecticut, Montana and Nevada in analogous matters. His testimony has been the basis for the certification of class in a variety of these matters. His testimony has been the basis for approval supporting settlement agreements in a variety of these and other pharmaceutical matters.

Specific Assignments

1972-1975: In consultation with Arthur D. Little, Inc., Dr. Hartman developed economic impact models to assess the effects of environmental regulations upon the U.S. pollution abatement equipment industry and upon a particular U.S. copper smelting company.

1972-1975: In consultation with Arthur D. Little, Inc., Dr. Hartman developed economic models to assess the regional macroeconomic and industrial impacts of alternative strategies to promote tourism-related industries. The models were used in the United States by the states of Maryland and Maine and for the Philadelphia Bicentennial Commission. Internationally, the models were used by the Ministry of Planning of Mexico to assess the national and regional importance of tourism coming into Acapulco.

1976-1977: Consultation with Arthur D. Little, Inc. for the U.S. Environmental Protection Agency. The effort involved the design, estimation and implementation of an econometric simulation model that was used to assess the impact of pollution abatement legislation on the U.S. copper industry. The model was designed to incorporate engineering cost estimates attributable to the abatement legislation while accounting for the noncompetitive pricing behavior in the industry. The model was used to evaluate and revise proposed abatement legislation. This analysis was the basis for Dr. Hartman's Ph.D. dissertation and several of his publications.

1977-1982: Working as the testifying expert, Dr. Hartman analyzed the presence of a price-fixing conspiracy among the major U.S. copper producers during the 1970's. His testimony addressed issues of liability and developed a model of damages. See

Affidavit to United States District Court for the Southern District of New York, J.N. Futia Co., Inc., Plaintiff, Against Phelps Dodge Corporation, et al., Defendants, 78 Civ. 4547 (ADS), 1978.

Deposition for United States District Court, Southern District of New York for Reading Industries, Inc., et al. (Plaintiffs) against Kennecott Copper Corporation, et al. (Defendants), 17 Civ. 1736 (MEL), 1982.

1979: Working for the California Energy Commission, Dr. Hartman developed and presented a Statement of Opinion and Critical Review of Selected Energy End-Use Models and Proposed Specifications for PG&E End-Use Modeling Efforts before the California Energy Commission Hearings on Utility Construction and Siting, November 26-30, 1979.

1984: Testifying expert for the class of all individuals who employed the services of members of Massachusetts Furniture and Piano Movers Association. The analysis developed an econometric model to assist in certifying the class and measuring the damages common to that class. See

Affidavit to United States District Court for the District of Massachusetts in the Matter of Kenett Corporation et al v. Massachusetts Furniture and Piano Movers Association Inc. et al, May 1984, Civil Action No. 82-140-Z.

1984-1986: In consultation with the U. S. Postal Service, Dr. Hartman identified appropriate econometric methods for analysis of the determinants of Postal Service costs. The particular methods he suggested were "hedonic" cost techniques, which are specifically designed to account for the fact that both increased levels of production and improved product attributes increase costs. The techniques assisted the Postal Service in quantification of the cost impacts of the attributes of service quality for alternative classes of service. For example, the techniques allowed for estimation of the differential cost impacts of alternative service priorities, size and weight attributes of the various classes of mail.

He later applied these techniques for a group of second class mailers. The analysis was introduced before the Postal Service Commission to assess whether proposed postal rate changes reflected actual costs.

1984-1986: The development of econometrically-based strategic planning models, which allow for estimation of the effects on corporate profits of alternative product design and pricing strategies. The models allow for examining specific design strategies by explicitly incorporating detailed product attributes. The models were developed for Westin Hotels and Shell Oil. The Westin models have been implemented into an interactive PC tool that facilitates pricing decisions at the front desk.

1985: For analysis presented before the International Trade Commission, Dr. Hartman helped develop and estimate a model to evaluate the domestic effects of importation of certain synthetic aramid fibers. The analysis was used in adjudicating an international patent infringement complaint.

1985-1986: Dr. Hartman participated in an analysis of one of the nation's largest mutual funds. The study was undertaken as part of a class action alleging inappropriate management fees. The study assessed competition in the money market mutual fund industry. It measured investors' sensitivity to changes in yield and to the level of services provided. It also statistically identified the determinants of the costs of providing mutual fund services.

1985-1986: The development for GTE Laboratories of econometric demand models for analysis and measurement of the determinants of demand for telecommunications services. The models explicitly address the separate customer decisions to subscribe to one of several telecommunications carriers and the demand for telecommunications services, conditional upon the subscription decision. The analysis was employed by GTE to assist their subsidiary, GTE Sprint, in the design of marketable services, where the services were differentiated by tariff, perceived service quality, provider reputation, and specialized customer services. The analysis is summarized in the paper

"Estimation of Household Preferences for Long Distance Telecommunications Carrier", Journal of Regulatory Economics, Volume 6, 1994.

1985-Present: Dr. Hartman has performed a variety of economic damage analyses in cases of personal injury, wrongful injury and wrongful death. He has worked for both plaintiff and defendant. He has been deposed in such matters as recently as 1995.

1986: For a major natural gas pipeline, preparation of an analysis of the effects of natural gas deregulation as proposed in the Federal Energy Regulatory Commission's Notice of Proposed Rulemaking No. 436.

1986-1987: Working for the class of owners of selected General Motors' X Cars and VW Rabbits, Dr. Hartman specified and estimated econometric models that assisted in the certification of class and estimation of class damages. The damages flowed directly from allegedly-concealed design flaws in these automobiles. The methods are described in

"The Use of Hedonic Analysis for Certification and Damage Calculations in Class Action Complaints," with M. Doane, The Journal of Law, Economics and Organization, Fall, 1987.

1986-1987: Development of damage models for litigation in high technology industries. The models were developed in several cases. One involved alleged patent infringement by a major Japanese semiconductor firm, and the second involved market foreclosure of a domestic minicomputer emulator. In these efforts, Dr. Hartman developed econometric models to estimate the market potential, absent the violation, for the particular product foreclosed or whose patent was infringed. The methods are described generically in

"Product Emulation Strategies in the Presence of Reputation Effects and Network Externalities: Some Evidence from the Minicomputer Industry," with D. Teece, Economics of Innovation and New Technology, Volume 1, 1990.

1987: Analysis of the competitive effects of relaxing the restrictions on the Bell Regional Operating Companies regarding their vertical extension upstream into equipment manufacture and downstream into the provision of selected telecommunication services. The study was introduced before Judge Greene in the triennial review of the divestiture of the Bell operating companies from AT&T.

1987-1988: For a major gas utility, participation in analysis of the economic effects arising if bypass of an existing pipeline were allowed by state and federal regulation. The analysis developed methods for assessing when competitive bypass is socially desirable. The analysis also developed and used an econometric model to simulate the effects of bypass on demand and prices.

1988: Analysis of the competitive effects the acquisition of trade secrets through the predatory hiring of a competitor's essential labor force. See

Analysis submitted in testimony in the case Universal Analytics Inc. v. MacNeil Schwendler, Corp.

1988-1989: As part of their proposed acquisition of Public Service of New Hampshire, Dr. Hartman was retained by Northeast Utilities, Inc. to develop and estimate load forecasting models. The models were used to assess the demand implications of alternative rate assumptions proposed as part of the acquisition. The forecasts were introduced as part of Northeast Utilities' filings before the bankruptcy court, the state public utility commissions, the SEC and the FERC.

1989: As part of major antitrust litigation against the leading vendors of airline computer reservation systems, Dr. Hartman helped develop liability analysis and models for the estimation of damages.

1989: As a proposed testifying expert for Parnelli Jones, Inc., Dr. Hartman analyzed the antitrust implications of Firestone's retail trade practices, particularly alleged vertical and horizontal restraints of trade. He designed damage models for the alleged violations.

1989 - Present: Dr. Hartman has performed and continues to perform the market analyses required for Hart-Scott-Rodino applications and second requests supporting mergers and acquisitions in a variety of industries, including specialty chemicals, airlines, health care and medical diagnostic products, and energy products and services.

1989-1990: Dr. Hartman participated as a principal investigator and testifying expert for the Division of RatePayer Advocates of the California Public Utility Commission in an analysis of the economic and legal implications of the proposed merger between Southern California Edison Company and San Diego Gas and Electric Company. Dr. Hartman's responsibilities included overall study design, econometric analysis of scale and scope economies arising with the merger, and analysis of efficiencies purportedly arising with the coordination of the demand-side management programs of the two utilities. His direct and surrebuttal testimony is found in

California Public Utilities Commission, Division of Rate Payer Advocates, Report on the Proposed Merger of the Southern California Edison Company and the San Diego Gas and Electric Company, Volume V, Chapter II, Application 88-12-035, February, 1990, Exhibit 10,500; and

California Public Utilities Commission, Division of Rate Payer Advocates, Report on the Proposed Merger of the Southern California Edison Company and the San Diego Gas and Electric Company, Surrebuttal: Econometric Analysis of Merger Impacts, Application 88-12-035, July, 1990, Exhibit 10,511.

1989-1990: Working with Arthur D. Little, Inc., Dr. Hartman participated as a principal investigator and testifying expert in a merger study for several small New England utilities within Nepool. Dr. Hartman designed and implemented a statistical study of returns to scale and scope in the industry. Using the statistical results, Dr. Hartman developed opinions regarding the efficiency effects of the proposed merger. His analysis appears as an independent Appendix to

Arthur D. Little, Inc., Evaluation of EUA's Proposed Acquisitions of UNITIL and Fitchburg, Report to Gaston and Snow, March 12, 1990, presented in support of the acquisition to the Securities and Exchange Commission and the New Hampshire Public Utilities Commission.

1990: Working for a group of commodity futures exchanges, Dr. Hartman participated as Principal Investigator in a critical review of a statistical and econometric study performed by the Commodity Futures Trading Commission. The CFTC study was developed to assess the effects of dual trading on commodity futures markets, in order to implement proposed regulations curtailing such trading.

1990: Working with Barakat and Chamberlin, Inc., Dr. Hartman developed a Ramsey pricing model for Arizona Public Service Corporation. The Ramsey pricing model was used to develop and explore alternative rate strategies for a variety of residential, commercial and industrial market segments. The analysis was submitted in formal rate hearings.

1990-1992: Working with the Technology Research Center of Arthur D. Little, Inc. for the United States Postal Service, Dr. Hartman specified and estimated econometric models to analyze the determinants of productivity for the largest 120 post offices in the United States. The econometric models are being used to identify the most and least productive offices, with the purpose of learning from the performance of the most productive offices in order to improve the performance of the least productive offices. The models are being used to design and implement incentive regulation mechanisms to increase productivity across post offices.

A second set of econometric models have been specified and estimated to quantify the effects of the attributes of alternative postal services and rate classes upon total postal service costs. The results of this analysis are being used to design postal rates for alternative classes of service which reflect the real costs of providing the services. The analysis and its results will be introduced into the postal rate hearings.

1990-1997: Working with the World Bank, Dr. Hartman has specified and is estimating a set of econometric models to measure both the level and types of pollutants emitted by United States plants and establishments and the costs of abating those pollutants. The models identify and quantify, at the plant level, the relationship between the emission of approximately 300 pollutants and the scale of production, the types of technology used, the age and characteristics of the plant and equipment used, the extent to which abatement equipment has been installed, and the costs (capital and operating) of abating alternative pollutants.

The models will be used in the following ways in developing countries and Eastern European countries: to assist the countries to predict and assess the environmental implications of reliance upon certain technologies and industries in development; to assess the effectiveness of alternative regulatory methods for abating pollution, including effluent standards, effluent taxes, effluent licenses, technology standards, effluent banks, and alternative property right schemes; to implement incentive regulation mechanisms to better stimulate abatement compliance; and to identify and prioritize those industries that can abate certain pollutants at least cost.

As part of this effort, Dr. Hartman has also designed a specific incentive regulation system for pollution abatement compliance in Indonesia. The system is based upon the most recent theory in regulated incentive mechanisms. The system will ultimately evolve into an effluent bank or a system of effluent fees. If the effort is

successful, it will form the basis for environmental institutions in other developing countries. In the process of designing this system, he has reviewed the institutional and statutory basis for environmental policy in Indonesia.

Also as part of this work, Dr. Hartman is in the process of designing the institutional and statutory structures for Environmental Protection Agencies in a variety of developing countries. The institutional structures will be designed to articulate and implement pollution abatement policies that are informed by the econometric modeling described above.

1991: Dr. Hartman participated as a principal investigator and testifying expert for the Missouri Public Service Commission in a critical analysis of the proposed merger between Kansas Power and Light Company and Kansas Gas and Electric Company. Dr. Hartman's responsibilities included overall study design, analysis of scale and scope economies arising with the merger, analysis of unanticipated transitional cost arising with the merger and an econometric event study of the stock market's response to the merger. His testimony appears in

A Critical Analysis of the Proposed Merger Between Kansas Power and Light Company and Kansas and Electric Company, Report to the Missouri Public Service Commission, March 25, 1991.

1991: Working for the Resolution Trust Corporation in its litigation against Michael Milken and Drexel Burnham Lambert Inc., Dr. Hartman developed data and econometric models to measure the size of the relevant antitrust markets dominated by Drexel and to estimate the size of the economic damages produced by Drexel's alleged monopolization of those markets.

1991-1992: Working for the Indonesian government and the United States Agency for International Development, Dr. Hartman critically reviewed the structure of the Indonesian electric power industry and the institutions regulating that industry. The purpose of the analysis was to assist the government with privatizing their energy industries. His analysis focused upon the following: developing better data and models for predicting demand and supply; identifying and implementing more efficient industrial structures; and developing better regulatory regimes.

1992: Working for the World Bank, Dr. Hartman designed methods to measure and compare the social value of the environmental effects of alternative development projects, at the microeconomic and macroeconomic levels. His analysis focused upon standard and contingent valuation survey approaches and their use in econometric settings.

1992-1993: Working for the World Bank in Bangkok, Dr. Hartman characterized and critically analyzed the environmental effects of Thailand's energy use patterns. He focused upon the use and production of electric power, petroleum, coal and natural gas. He developed recommendations for environmental policy changes that included, but were not limited to, fuel taxes, effluent standards, technology standards, and privatization of environmental monitoring within a "bubble" policy approach.

1992-1993: Working for a biomedical company (a producer of vascular grafts) in an antitrust situation, Dr. Hartman designed and implemented survey techniques and econometric models to measure the size of the relevant markets and market power within those markets.

1992-1993: In a proceeding before the International Trade Commission, Dr. Hartman critiqued ITC econometric methods used for estimating elasticities of demand, supply and substitution among domestic and imported products. His focus was selected steel products. He formulated and estimated alternative models and methods to improve the existing estimates. He developed presentation materials for the Commission and testified before the Commission. His testimony is included in

LECG, Petitioners' Economic Testimony in the Matter of Certain Carbon Steel Flat Products, Final Hearing before the United States International Trade Commission, June 29-30, 1993; and

LECG, Petitioners' Post Hearing Brief in the Matter of Certain Carbon Steel Flat Products, before the United States International Trade Commission, July 7, 1993.

1992-1997: Working for the World Bank, Dr. Hartman has designed and is currently implementing a set of regional econometric/engineering models that accurately portray and predict the economic, environmental, infrastructural and socio-demographic effects of large-scale, World-Bank-funded infrastructural projects. The models combine input-output and econometric methods.

Given the Bank experience that many of their financially-sponsored projects create significant unanticipated environmental effects, the models are designed to be broad and comprehensive enough to incorporate and predict all important effects. The models systematically characterize the relationship between resource-based economic growth and the regional environment in which that growth occurs.

The models are currently being implemented for assessing project developments in the Carajas region of the Brazilian Amazonian rain forest, which is a large, dynamic and ecologically sensitive frontier area. The methods implemented for Brazil will be generalized for analysis of economic growth in ecologically similar areas, such as the Lake Baikal region of the former Soviet Union.

1993-1994: Working for the Commonwealth of the Northern Mariana Islands, Dr. Hartman developed and presented testimony rebutting a complaint by the United States Department of Justice that the Public School System of the Commonwealth practiced employment discrimination against teachers of Filipino and native Carolinian origin. Dr. Hartman's testimony examined both hiring and compensation practices. His testimony included hedonic regression analysis of the market for public school teachers in the islands. This analysis measured how teacher attributes and qualifications determined teacher salaries and hiring. The results of the analysis indicated that salary differentials resulted from differences in teacher qualifications rather than discrimination.

1993-Present: Working either as the testifying expert or supporting other testifying experts, Dr. Hartman has participated in a variety of patent infringement cases. He has developed, supported and estimated alternative theories and measures of damages for manufacturers of coaxial cable and a variety of alternative medical devices.

1993-1998: Working as the testifying expert, Dr. Hartman developed models estimating the damages to the business of a construction general contractor that were caused by the malicious prosecution of the contractor's insurance company.

1994: Working for the United States Wheat Associates in a proceeding before the ITC, Dr. Hartman designed and implemented an econometric study to assess and quantify the extent to which Canadian Wheat Board imports into the U.S. undersold domestic supplies and thereby materially interfered with the United States Department of Agriculture Wheat Program. The econometric study was hedonic. The study measured how non-price attributes are valued in U.S. wheat markets. The non-price attributes analyzed included such

things as protein content, shipment defects, moisture content and a number of end-use performance characteristics. Having measured the value of these attributes in U.S. markets, the analysis indicated how the Canadian Wheat Board fixed import prices below market levels, given the attributes of the imported wheat.

1994: Working as a testifying expert for Gallo Wines in a proceeding before the ITC, Dr. Hartman designed and implemented a statistical study of the US wine industry that analyzed the impacts of Chilean wine imports upon the domestic industry that would result from the inclusion of Chile in a Free Trade Agreement with the US.

1994: Working as a testifying expert for an insurer of a member of the Asbestos Claims Facility and Center for Claims Resolution, Dr. Hartman developed a statistical analysis estimating alternative indemnification liabilities expected under the Settlement Share Analysis of the Center for Claims Resolution and under the tort system. The results were used to make strategic decisions regarding the desirability of participating in the Class Action Settlement relative to litigating the claims.

1994: Working for several regional Bell Operating companies, Dr. Hartman has developed models and survey procedures to analyze and quantify the determinants of demand for local services, long-distance services and PCS services. The models quantify how consumers respond to and select among alternative carriers who differentiate their services by performance attributes and vendor reputation. The models also estimate the level of service demand, conditional upon the selection of service vendor. The models are being used to quantify the nature of competition among local carriers and long-distance carriers in the Intralata market. The models are also being used to help develop bidding strategies for specific RBOCs as they participate in the FCC auctions for the PCS spectra.

1995: Working as a testifying expert for a group of independent television stations and program producers, Dr. Hartman developed an econometric analysis of the impacts of the Prime Time Access Rule (PTAR) upon the economic performance of independent television stations. The analysis was submitted to the Federal Communications Commissions as part of their consideration of the repeal of the Rule. Dr. Hartman's analysis proved that PTAR had a strong, statistically significant effect upon the economic performance of these stations, and that its repeal would adversely impact them.

His testimony is included in

The Economic Effects of Repealing the Prime Time Access Rule: Impact on Broadcasting Markets and the Syndicated Program Market, Report prepared by LECG and presented before the Federal Communications Commission, MM Docket No. 94-123, March 7, 1995.

1995: Working for a big six accounting firm, Dr. Hartman designed and implemented a hedonic regression analysis to calculate transfer prices under the comparable uncontrolled price (CUP) method. The analysis is discussed in

"The Use of Regression Techniques in Transfer Price Analysis," with Delores Wright and J.D. Opdyke, European Taxation, 1996.

1995-1996: Working as the testifying expert for a major high tech firm in New England, Dr. Hartman has developed rebuttal and affirmative testimony to rebut claims of age discrimination in the termination of a group of employees over forty. His rebuttal testimony involved critically reviewing statistical analyses purporting to demonstrate disparate treatment and disparate impact. His affirmative testimony has involved designing and implementing econometric models to identify and estimate those factors actually determining the compensation and termination decisions of the defendant.

1995-1996: Working as the testifying expert for the Office of Attorney General of the State of Massachusetts, Dr. Hartman has analyzed and helped develop the State's positions on the following issues: restructuring the electric utility industry in Massachusetts and New England; regulating those entities in the restructured industry that will remain subject to regulation; and valuing those assets that may be stranded as a result of restructuring. As part of the effort, Dr. Hartman also critically reviewed the restructuring proposals of the largest utilities in the state. His testimony appears in

"The Market for Power in New England: The Competitive Implications of Restructuring," a report prepared for the Office of the Attorney General, Commonwealth of Massachusetts and submitted February 16, 1996 in support of their filing to the Department of Public Utilities as part of DPU 95-30, which was initiated August 15, 1995.

1995-1996: Working as the testifying expert, Dr. Hartman represented Florida Power Corporation in a contract dispute with Independent Power Producers. His analysis and testimony focused upon issues of damages incurred as a result of a breach of contract.

1995-1999: Working with a team of economists, Dr. Hartman represented the group of wholesalers in the retail prescription drug price fixing conspiracy case. His efforts included industry analysis and participation in cross examination of plaintiffs' experts.

1996: Working as the testifying expert for the Division of Public Utilities of the State of Rhode Island, Dr. Hartman has analyzed and helped develop the State's positions on restructuring the electric utility industry in Rhode Island and New England, for both the State's Public Utilities Commission and the FERC. As part of the effort, Dr. Hartman also critically reviewed the restructuring proposals of some of the utilities in the state. His testimony appears in

"The Division Plan to Restructure the Electric Utility Industry in Rhode Island," Volume 2 of Supporting Testimony to the State of Rhode Island and Providence Plantations Public Utilities Commission, in re: Electric Industry Restructuring, Docket 2320, April 12, 1996.

1996: Working with a team of engineering firms, an international investment banking firm, a big six accounting firm and several national law firms, Dr. Hartman developed models of demand, supply and futures markets in restructured electric power markets to assist a major industry participant in evaluating specific alternative acquisition strategies.

1996: Working with a team of economists developing evidence for presentation before the High Court of New Zealand, Dr. Hartman critically reviewed and rebutted a variety of econometric analyses of natural gas markets and more broadly-defined energy markets in New Zealand. These analyses were used to determine the size of antitrust markets for a variety of energy products.

1996: Dr. Hartman was retained by a major mid-west utility to critically review and rebut analyses and evidence presented before the FERC and the relevant State Commissions concerning the competitive impacts of the proposed Primergy merger.

1996-2003: Working as the testifying expert, Dr. Hartman analyzed the employment practices and procedures of the Florida Power Corporation during a reduction in force, to assess the validity of a complaint that those practices and procedures resulted in a pattern of age discrimination. In his testimony, Dr. Hartman implemented a variety of statistical and econometric analyses to address and quantify claims of disparate impact and disparate treatment.

1996-1997: Working for US Airways with a team of economists, Dr. Hartman specified and estimated a variety of econometric consumer choice models to measure customer preferences for the services of alternative air carriers in a cross section of US-European origin-destination markets. The models were used to evaluate the economic impacts of both the proposed alliance between American Airlines and British Airways and alternative proposals to condition that alliance.

1996-1997: Working as the testifying expert, Dr. Hartman represented a major national retail pharmaceuticals wholesaler in litigation brought by a regional distributor alleging monopolization of wholesale services to distinct classes of trade. His analysis addressed market definition, the analysis of competition generally and analysis of the competitive impact of specific contractual arrangements.

1997: Working with a team of experts, Dr. Hartman analyzed economic impacts of the construction of the Warrior Run Cogeneration plant which was under construction in Western Maryland and was contracted to sell power to Allegheny Power System's (APS) Maryland subsidiary, Potomac Edison.

1997: Working as the testifying expert for the Office of Ratepayer Advocates of the California Public Utilities Commission, Dr. Hartman critically reviewed the efficiencies estimated by Applicants to be induced by the proposed merger of Pacific Enterprises and Enova Corporation.

1997: Working with a team of economists, Dr. Hartman prepared affirmative and rebuttal testimony in a breach of contract matter in the pharmaceutical industry arbitrated before the International Chamber of Commerce.

1997-2000: Working as the testifying expert, Dr. Hartman developed analysis supporting certification of class and estimation of damages for the class of purchasers of thermal fax paper in the US over the period 1990-1992 who were damaged as a result of a price fixing conspiracy by major suppliers.

1998: Working as the testifying expert, Dr. Hartman analyzed the employment practices, procedures and personnel data of the Florida Power Corporation, in general and in particular, to assess the validity of a complaint that a specific employee had been subjected to racial discrimination.

1998-1999: Working with a team of economists for the Office of the Attorney General of the State of Massachusetts, Dr. Hartman developed and implemented econometric models to analyze and measure the health care costs arising under the Medicaid program that have been attributable to smoking. The analysis appears in the following documents:

David M. Cutler, Arnold M. Epstein, Richard G. Frank, Raymond S. Hartman, Charles King and Joseph P. Newhouse, *The Impact of Smoking on Medicaid Spending in Massachusetts: 1970-1998 -- Report on Methods*, June 15, 1998;

David M. Cutler, *et. al.*, *The Impact of Smoking on Medicaid Spending in Massachusetts: 1970-1998 - Results From The Inclusive Approach for Adults*, July 1, 1998;

David M. Cutler, *et. al.*, *The Impact of Smoking on Medicaid Spending in Massachusetts: 1991-1998 - Results From The Disease-Specific Approach for Adults and Overall Summary*, July 11, 1998.

Drawing upon these efforts, Dr. Hartman worked with the same team of experts to analyze the economic impacts of the Master Settlement Agreement and to present their findings to the Tobacco Fee Arbitration Panel.

1999: Working as one of two testifying experts for the Office of the Attorney General of the Commonwealth of Massachusetts, Dr. Hartman critically analyzed potential rate increases relevant to Joint Petitions introduced by both Eastern Enterprises/Colonial Gas Company and Boston Edison/Commonwealth Energy Systems. His testimony appears as

Joint Testimony of Seabron Adamson and Raymond Hartman on Behalf of the Massachusetts Attorney General, in the matter of the Joint Petition of Eastern Enterprises and Colonial Gas Company For Approvals of Merger Pursuant to G.L. c. 164, §§ 96 and 94, DTE 98-128, March 26, 1999.

Joint Testimony of Seabron Adamson and Raymond Hartman on Behalf of the Massachusetts Attorney General, in the matter of the Joint Petition of Boston Edison Company, Cambridge Electric Light Company, Commonwealth Electric Company and Commonwealth Gas Company For Approval of Rate Plan Pursuant to G.L. c. 164, §§ 76 and 94, DTE 99-19, April 30, 1999.

1999-2000: Dr. Hartman was retained by a group of industrial purchasers of copper to develop and implement methods and models to assess liability and measure damages in the matter involving the manipulation of the spot and future prices of copper on the London Metals Exchange by Sumitomo Corporation and Yasuo Hamanaka over the period 1987-1996.

1999-Present: Dr. Hartman consulted with counsel and the testifying expert in the development of data and models needed to certify class and measure damages in a price fixing case involving the manufacturer (Mylan) of generic clorazepate and lorazepam.

1999-2001: Working as the testifying expert, Dr. Hartman analyzed liability arising from a variety of restrictive dealer arrangements implemented by Dentsply International Inc., a U.S. manufacturer of artificial teeth, to foreclose entry by rival manufacturers from the US dental-laboratory dealer network. Dr. Hartman developed and implemented methods to measure damages to the class of dental laboratories that purchased artificial teeth from Dentsply at prices above the competitive prices that would have obtained absent the restrictive dealer arrangements.

1999-2000: Working with a team of economists for the Federal Trade Commission, Dr. Hartman analyzed the pro-competitive and anti-competitive nature of settlement agreements between generic and pioneer drug manufacturers resolving patent infringement litigation arising from certification under Paragraph IV of the Hatch Waxman Act (Drug Price Competition and Patent Term Restoration Act). Particular settlements analyzed include the settlement between Abbott Laboratories and Geneva Pharmaceuticals regarding the drug Hytrin and the settlement between Hoechst Marion Roussel (Aventis) and Andrx Corporation regarding the drug Cardizem.

1999-2000: Working as the testifying expert for the class of purchasers of Nine West shoes, Dr. Hartman was asked to analyze liability and measure damages arising from an alleged conspiracy to raise and maintain the prices of women's shoes manufactured by the Nine West Group Inc. and sold by a variety of general merchandise retailers through their upscale retail department stores. The defendants in the case included Nine West Group Inc., Federated Department Stores, Inc., Dayton Hudson Corporation, Lord and Taylor, Nordstrom, Inc., May Department Stores, Macy's, Bloomingdale's, Inc., and other general merchandise retailers.

2000: Working with the testifying expert, Dr. Hartman assisted in the analysis and estimation of economic damages to a Class defined as all smokers with 20-pack years each of whom contracted lung cancer which was substantially contributed to by cigarette smoking.

2000: Working with a team of economists, Dr. Hartman developed econometric models to analyze and measure the impacts of subject imports, non-subject imports and factor price changes upon the prices of structural steel beams during the period 1998-1999. The work was presented before the International Trade Commission.

2001: Working with a team of economists, Dr. Hartman developed econometric models to analyze and measure the impacts of subject imports, non-subject imports and factor price changes upon the prices of structural steel beams and during 2000. He also developed econometric models to analyze and measure the impacts of subject imports, non-subject imports and factor price changes upon the prices of cold rolled and hot rolled steel during the Period of Inquiry of 1997-1999. Both efforts were presented before the International Trade Commission.

2001-present: Working as the testifying expert, Dr. Hartman developed and submitted testimony in support of class certification of and the calculation of damages to the class of indirect purchasers of the anti-hypertensive drug, Hytrin, produced by Abbott Laboratories and the generic equivalent of Hytrin, generic terazosin hydrochloride, produced by Geneva Pharmaceuticals. The class alleges monopolization and violation of the Hatch Waxman Act (Drug Price Competition and Patent Term Restoration Act).

2001-Present: Working as consultant and testifying expert, Dr. Hartman has been retained by counsel to the classes of indirect or direct purchasers of a variety of branded pharmaceuticals (including but not limited to Augmentin, Bextra, Cipro (New York, California, U.S.), BuSpar, Celebrex, Vioxx, K-Dur, Taxol, Lupron, Relafen, Paxil, Remeron, Tamoxifen, Premarin and Wellbutrin) to analyze and submit testimony dealing with class certification, liability, market definition, damage calculations and settlement allocations arising from violations of the Hatch Waxman Act (Drug Price Competition and Patent Term Restoration Act) and related state-specific unfair competition statutes.

Dr. Hartman's testimony in this area has been relied upon (and cited thereto) for certification of end-payer consumer classes in the following matters:

- *In re: Terazosin Hydrochloride Antitrust Litigation*, United States District Court, Southern District of Florida, Case No. 99-MDL-1317-Seitz/Klein [Order Granting Indirect Purchaser Plaintiffs' Motions for Class Certification of State-Wide Classes, April 8, 2004]

- *In re Cipro Cases I and II*, D043543 (JCCP Nos. 4154, 4220), Court of Appeal, Fourth Appellate District, Division One, State of California [Decision affirming class certification not titled but marked as "Not to Be Published in Official Reports," Filed 7/21/04]
- *In re: Relafen Antitrust Litigation*, United States District Court, District of Massachusetts, Master File No. 01-12239-WGY [Memorandum granting certification for an exemplar class, May 12, 2004]

Dr. Hartman's testimony has been relied upon (and cited as necessary) for approval of proposed settlement allocations in the following matters:

- *In re: Lupron® Marketing and Sales Practices Litigation*, United States District Court, District of Massachusetts, MDL No. 1430, Master File No. 01-CV-10861-RGS [Memorandum and Order Approving Settlement and Certifying the Class, May 12, 2005]
- *HIP Health Plan of Florida, Inc., On Behalf of Itself and All Others Similarly Situated v. Bristol-Myers Squibb Co. and American Bioscience*, Case Number 1:01CV01295, United States District Court for the District of Columbia
- *In re Buspirone Antitrust Litigation*, MDL No. 1413, United States District Court for the Southern District of New York
- *In re Relafen Antitrust Litigation*, United States District Court, District of Massachusetts, Master File No. 01-CV-12222-WGY
- *In re Remeron Antitrust Litigation*, United States District Court, District of New Jersey, Master Docket No. 02-CV-2007

2001: Working as consultant to counsel for various U.S. steel producers, Dr. Hartman worked with a team of economists to develop econometric models to analyze and measure the impacts of imports, demand and factor price changes upon the prices of domestically produced carbon steel flat products and carbon steel long products in the Section 201 hearings before the International Trade Commission. Dr. Hartman testified before the ITC in the hearings. The Commission decided in favor of most of the products subject to these analyses.

2001: Working as consultant to counsel for Nucor Steel Corporation, Dr. Hartman worked with a team of economists to develop econometric models to analyze and measure the impacts of imports, demand and factor price changes upon the prices of domestically produced carbon steel cold rolled products for preliminary hearings before the International Trade Commission.

2001-2002: Consulting to counsel for the Plaintiff Class, Dr. Hartman analyzed the targeting of youth by cigarette advertisements in the matter *in re Devin Daniels, et. al., v. Philip Morris Companies, Inc., et. al.*, Case Number 719446, coordinated with JCCP 4042.

2001-2003: Working as testifying expert, Dr. Hartman developed and presented statistical evidence analyzing the relative performance of a particular cardiovascular surgeon litigating the fact that his surgical privileges had been revoked as a result of incompetent surgical performance and results. He testified before an arbitration panel in the matter.

2003: Working as the testifying expert for Defendants, Dr. Hartman submitted testimony analyzing the allegation of racial discrimination on the part of Wells Fargo Home Mortgage, Inc. and Norwest Mortgage, Inc.

2003: Working as a consulting expert to counsel for the class of purchasers of graphite electrodes, Dr. Hartman developed econometric models to assess the impact of alleged antitrust violations.

2003: Working as a consulting expert for counsel to the class of direct purchasers, Dr. Hartman reviewed materials in a matter regarding antitrust allegations concerning the manufacture and sale of microcrystalline cellulose in the United States.

2003: Working as a consulting expert to counsel for a large electrical generation company, Dr. Hartman developed economic and econometric models to analyze the allegation that this electrical generation company participated in a conspiracy to manipulate prices of power sold in California.

2003: Working as the testifying expert, Dr. Hartman submitted testimony which analyzed and calculated the economic impacts and damages to the U.S. growers and quota holders of flue-cured and burley tobacco leaf caused by a price-fixing conspiracy among the major U.S. tobacco leaf buyers and cigarette manufacturers.

2004: Working as the consulting expert for the United States Department of Justice, Dr. Hartman critically analyzed the calculation of the economic damages borne by an electric power generation utility as a result of the breach of the Standard Contract with the U.S. Department of Energy to remove spent nuclear fuel in 1998. Dr. Hartman's analysis included a critical review and rebuttal of the models and data put forward by the utility's experts in the calculation of damages; the development and presentation of alternative and improved models and corrected data to more accurately calculate damages; a critical review of econometric analyses put forward by one of the utility's experts; and a review of the economics of re-licensing existing nuclear generating facilities.

2004: Working as the testifying expert, Dr. Hartman submitted testimony in support of the certification of the class of purchasers of electrical carbon products who have been alleged to have been impacted and injured economically as a result of a price-fixing customer-allocation conspiracy of the major suppliers of such products in the United States.

2004-Present: Working as the testifying expert, Dr. Hartman submitted testimony in support of the certification of the class of end payer purchasers of those pharmaceutical products produced by AstraZeneca, the Bristol Myers Squibb Group, the Johnson and Johnson Group, the Glaxo-Smith-Kline Group and the Schering Plough Group that were subject to an alleged scheme to fraudulently inflate their Average Wholesale Price (AWP), thereby fraudulently inflating the reimbursement rates paid by the Class members for those pharmaceuticals when their reimbursement rates were formulaically related to the AWP. Dr. Hartman is consulting on related litigation undertaken by the Offices of the Attorneys General for the States of New York, Connecticut, Arizona, Nevada, Montana Massachusetts and Pennsylvania. He has also submitted testimony establishing liability and calculating damages for those Classes certified by the MDL Court and those States seeking remedy.

2004-2005: Working as a consulting expert to counsel for a major electricity and gas utility holding company, Dr. Hartman developed models to evaluate allegations of affiliate abuse by the regulated gas distribution entities and the trading entities of the holding company. The alleged abuses concerned spot and forward gas markets in California.

2005: Working as the testifying expert for the United States Department of Justice, Dr. Hartman developed models to critically analyze the cost submissions to the U.S. Court of Federal Claims by the TVA for monetary damages alleged to have resulted from partial breach by the U.S. Department of Energy of the Standard Contract to remove spent nuclear fuel from TVA beginning in 2002. Dr. Hartman's analysis included a critical review and rebuttal of the models, data and cost analyses put forward by the utility and the development and implementation of alternative and improved models and corrected data to more accurately calculate costs attributable to the alleged partial breach.

2005-2006: Working again as the testifying expert for the United States Department of Justice, Dr. Hartman developed models to critically analyze the cost submissions to the U.S. Court of Federal Claims by the Systems Fuel Inc. (a subsidiary of Entergy) and Entergy for monetary damages alleged to have resulted from partial breach by the U.S. Department of Energy of the Standard Contract to remove spent nuclear fuel from Entergy facilities in Mississippi and Arkansas. Dr. Hartman's analysis has included a critical review and rebuttal of the Entergy's models, data and cost analyses put forward by the utilities and the development and implementation of alternative and improved models and corrected data to more accurately calculate costs attributable to the alleged partial breach.

2006: Working as the testifying expert for counsel to the Plaintiffs in the matters *In Re: Prempro Products Liability Litigation* (in the United States District Court for the Eastern District of Arkansas, Western Division, MDL #1507, July 31, 2003) and *In Re: Hormone Therapy Litigation* (in the Court of Common Pleas Philadelphia County, MDL #00001, November 2003), Dr. Hartman analyzed and measured the importance of the Premarin family of products to its manufacturer, Wyeth Corporation, in terms of sales, profitability and market strategies since the introduction of Premarin in the United States in 1943. He analyzed and calculated compensatory damages in the form of unjust enrichment earned by Wyeth as a result of the sale of the Premarin family of products over the period 1990-2002. He also developed methods for determining the amount of punitive damages relevant to the allegations in these matters.

2006: Working as the testifying expert for counsel to a class of end-payors, Dr. Hartman analyzed whether that class was impacted, injured and damaged economically as a result of a scheme involving Defendants McKesson Corporation and First DataBank (FDB), a scheme alleged to inflate the mark-up between two pharmaceutical list prices (the wholesale acquisition cost (WAC) and the average wholesale price (AWP)). The impact of the "AWP Inflation Scheme" was to fraudulently increase the reimbursement rates paid by the class members, since those reimbursement rates were and are formulaically determined by the inflated AWP. As part of his analysis, Dr. Hartman submitted additional testimony calculating consumer benefits arising from a proposed settlement between Defendants and Court to eliminate the "AWP Inflation Scheme." The settlement is described in *Settlement Agreement and Release, New England Carpenters Health Benefits Fund, et al. v. First Databank, Inc., and McKesson Corporation*, United States District Court District of Massachusetts, C.A. No. 1:05-CV-11148-PBS, August 2006.

Attachment A.2
Recent Testimony at Deposition and Trial

**RECENT TESTIMONY OF RAYMOND HARTMAN
AT DEPOSITION, HEARING OR TRIAL**

1995

The Economic Effects of Repealing the Prime Time Access Rule: Impact on Broadcasting Markets and the Syndicated Program Market, report presented in informal hearings before the Federal Communications Commission, MM Docket No. 94-123, March 7, 1995

Gillam v. Abex, et. al., San Francisco Superior Court No. 966241, 1995 (deposition)

Trilogy Communications Inc. v. Times Fiber Communications & LPL Technologies Inc., United States District Court for the Southern District of Mississippi, Jackson Division, Civil Action No. J91-0542 (W)(S), 1995 (deposition)

1996

Hall v. Abex, et. al., San Francisco Superior Court No. 958853, 1996 (deposition)

Sowers v. Abex, et. al., San Francisco Superior Court No. 949184, 1996 (deposition)

1997

Hillenbrand v. INA/Aetna, Sacramento County Superior Court No. 519223, 1997 (deposition)

1998

Hillenbrand v. INA/Aetna, Sacramento County Superior Court No. 519223, 1998 (trial)

Trilogy Communications Inc. v. Pennie & Edmonds, LLP, et. al., United States District Court for the Southern District of Mississippi, Jackson Division, Civil Action No. CIV-3:97CV722BN (deposition)

Paper Systems Incorporated v. Mitsubishi Corporation; Mitsubishi International Corporation; Mitsubishi Paper Mills Ltd.; Elof Hansson Paper & Board, Inc.; Kanzaki Specialty Papers, Inc.; Oji Paper Co., Ltd.; and Nippon Paper Industries Co., Ltd. (Civil Action No. 96-C-959), consolidated with *Graphic Controls Corp. v. Mitsubishi Corporation; Mitsubishi International Corporation; Mitsubishi Paper Mills Ltd.; Appleton Papers, Inc.; Elof Hansson Paper & Board, Inc.; Kanzaki Specialty Papers, Inc.; Oji Paper Co., Ltd.; and Nippon Paper Industries Co., Ltd.* (Civil Action No. 97-C-412) and *Victor Paper Roll Products, Inc. v. Mitsubishi Corporation; Mitsubishi International Corporation; Mitsubishi Paper Mills Ltd.; Appleton Papers, Inc.; Elof Hansson Paper & Board, Inc.; Kanzaki Specialty Papers, Inc.; Oji Paper Co., Ltd.; and Nippon Paper Industries Co., Ltd.* (Civil Action No. 97-C-508), United States District Court for the Eastern District of Wisconsin (deposition)

1999

Joint Testimony of Seabron Adamson and Raymond Hartman on Behalf of The Massachusetts Attorney General in. re The Joint Petition of Eastern Enterprises and Colonial Gas Company for Approvals of Merger

Pursuant to G.L.c. 164 " 96 and 94, before the Department of Telecommunications and Energy, D.T.E. 98-128 (hearing)

Joint Testimony of Seabron Adamson and Raymond Hartman on Behalf of The Massachusetts Attorney General in re The Joint Petition of Boston Edison Company, Cambridge Electric Light Company, Commonwealth Electric Company, and Commonwealth Gas Company for Approval of Rate Plan Pursuant to G.L.c. 164 " 76 and 94, before the Department of Telecommunications and Energy, D.T.E. 99-19 (hearing)

2001

Oral testimony before the International Trade Commission regarding the impacts of imports, domestic demand and factor price changes upon the prices of domestically produced carbon steel flat products and carbon steel long products during the Section 201 Hearings (Inv. No. TA-201-073 (final))

2002

In re Terazosin Hydrochloride Antitrust Litigation, Case No. 99-MDL-1317 Seitz/Garber, consolidated, United States District Court for the Southern District of Florida, (deposition on affirmative and rebuttal testimony in support of class certification and deposition on affirmative testimony on damage analysis)

In re Buspirone Antitrust Litigation, United States District Court, Southern District of New York, MDL Docket No. 1410 (deposition on affirmative and rebuttal testimony on class certification)

Anne Cunningham and Norman Mermelstein, Individually and on Behalf of all Others Similarly Situated, v. Bayer AG, Bayer Corporation, Barr Laboratories, Inc, The Rugby Group, Inc., Watson Pharmaceuticals, Inc. and Hoechst Marion Roussel, Inc., Index No. 603820-00, Supreme Court of the State of New York, County of New York (deposition on affirmative testimony on class certification)

In re Ciprofloxacin Hydrochloride Antitrust Litigation, Master File No. 1:00-MD-1383, United States District Court for the Eastern District of New York. (deposition on affirmative testimony on class certification)

2003

In re Terazosin Hydrochloride Antitrust Litigation, Case No. 99-MDL-1317 Seitz/Garber, consolidated, United States District Court for the Southern District of Florida, (deposition on rebuttal testimony on damage analysis)

Anne Cunningham and Norman Mermelstein, Individually and on Behalf of all Others Similarly Situated, v. Bayer AG, Bayer Corporation, Barr Laboratories, Inc, The Rugby Group, Inc., Watson Pharmaceuticals, Inc. and Hoechst Marion Roussel, Inc., Index No. 603820-00, Supreme Court of the State of New York, County of New York (deposition on rebuttal testimony in support of class certification)

In re Ciprofloxacin Hydrochloride Antitrust Litigation, Master File No. 1:00-MD-1383, United States District Court for the Eastern District of New York. (deposition on rebuttal testimony in support of class certification)

Cipro Cases I and II, Judicial Council Coordination Proceeding Nos. 4154 and 4220 (Superior Court, San

Diego County) (depositions on affirmative and rebuttal testimony in support of class certification)

In re Relafen Antitrust Litigation, United States District Court, District of Massachusetts, Master File No. 01-CV-12222-WGY (depositions on affirmative and rebuttal testimony on class certification and affirmative testimony on damages)

Dr. Gregory Derderian, et. al., Plaintiffs, v Genesys Health Care Systems, et. al., Defendants, Case No. 99-64922-CK, State of Michigan, Circuit Court for the County of Genesee (testimony before arbitration panel)

In re S&M Farm Supply, Inc. v. Pharmacia Corporation; and Monsanto Company, Case No. 4:02CV518ERW, United District Court for the Eastern District of Missouri (deposition on affirmative testimony in support of class certification)

In re D. Lamar DeLoach, et. al., Plaintiffs, v. Philip Morris Companies, Inc., et. al., Defendants, in the United States District Court for the Middle District of North Carolina, Greensboro Division, Case No. 00-CV-1235 (depositions on affirmative and rebuttal testimony calculating damages)

2004

In re Ciprofloxacin Hydrochloride Antitrust Litigation, Master File No. 1:00-MD-1383, United States District Court for the Eastern District of New York (depositions on affirmative and rebuttal testimony calculating damages and affirmative and rebuttal testimony analyzing liability and market definition)

In re Lupron Marketing and Sales Practices Litigation, MDL No. 1430, CA No. 01-CV-10861, United States District Court, District of Massachusetts (deposition on affirmative testimony in support of class certification)

In re Pharmaceutical Industry Average Wholesale Price Litigation, United States District Court for the District of Massachusetts, MDL, No. 1456, CIVIL ACTION: 01-CV-12257-PBS (deposition on affirmative testimony in support of class certification)

2005

In re Lupron Marketing and Sales Practices Litigation, MDL No. 1430, CA No. 01-CV-10861, United States District Court, District of Massachusetts, (submission of written testimony at trial)

In re Tennessee Valley Authority, Plaintiff v. United States, Defendant, United States Court of Federal Claims, No. 01-249-C, (June 2, 2004 deposition and July 14-15, 2004 trial)

Lynne A. Carnegie v. Household International, Inc., Household Bank, f.s.b., successor in interest to Beneficial National Bank, Household Tax Masters Inc., formerly known as Beneficial Tax Masters, Inc., Beneficial Franchise Company, Inc., H&R Block, Inc., H&R Block Services, Inc., H&R Block Tax Services, Inc., H&R Block Eastern Tax Services, Inc., Block Financial Corp. and HRB Royalty, Inc., No. 98 C 2178, United States District Court for the Northern District of Illinois Eastern Division, (submission of written testimony and deposition in calculation of damages)

2006

In re Pharmaceutical Industry Average Wholesale Price Litigation, United States District Court for the District of Massachusetts, MDL, No. 1456, CIVIL ACTION: 01-CV-12257-PBS (deposition testimony in calculation of damages for the State of Connecticut; submission of written testimony and deposition testimony in the calculation of damages and penalties for the State of Montana and the State of Nevada; submission of written testimony on summary judgment; submission of written testimony in support of class certification for Track 2 defendants; appearance at trial)

System Fuels, Inc., on its own behalf and as agent for System Energy Resources, Inc. and South Mississippi Electric Power Association, Plaintiff, v. The United States, Defendant, in the United States Court of Federal Claims, No. 03-2624C (submission of expert report and July 25, 2006 deposition)

System Fuels, Inc. and Entergy Arkansas, Inc. v. United States, in the United States Court of Federal Claims, No. 03-2623C (submission of expert report and December 20, 2006 deposition)

New England Carpenters Health Benefits Fund; Pirelli Armstrong Retiree Medical Benefits Trust; Teamsters Health & Welfare Fund of Philadelphia and Vicinity; and Philadelphia Federation of Teachers Health and Welfare Fund, District Council 37, AFSCME - Health & Security Plan; June Swan; Maureen Cowie And Bernard Gorter v. First Databank, Inc., and McKesson Corporation, United States District Court District of Massachusetts, C.A. No. 1:05-CV-11148-PBS (submission of written testimony in support of class certification)

Attachment B
Materials Relied Upon

Legal Documents

Berndt, Ernst R., Report of Independent Expert Professor Ernst R. Berndt to Judge Patti B. Saris, *In Re Pharmaceutical Industry Average Wholesale Price Litigation*, MDL No. 1456, Civil Action No. 01-12257-PBS, February 9, 2005.

Complaint for Permanent Injunction and Other Equitable Relief Pursuant to Section 7A(g)(2) of the Clayton Act and Section 13(b) of the Federal Trade Commission Act, *Federal Trade Commission v. The Hearst Trust, The Hearst Corporation and First Databank, Inc.*, United States District Court for the District of Columbia, Civ. No. 1:01CV00734.

Edmunds, Judge Nancy G., Decision in certifying class *In re: Cardizem CD Antitrust Litigation*, Master File No. 99-MD-1278, 200 F.R.D. 326 (E.D. Mich. 2001).

Hartman, Raymond S., Declaration of Raymond S. Hartman in Support of Plaintiffs' Motion for Class Certification, *In Re Pharmaceutical Industry Average Wholesale Price Litigation*, MDL No. 1456, Civil Action No. 01-12257-PBS, September 3, 2004.

Hartman, Raymond S., Rebuttal Declaration of Dr. Raymond S. Hartman in Support of Plaintiffs' Motion for Class Certification, *In Re Pharmaceutical Industry Average Wholesale Price Litigation*, MDL No. 1456, Civil Action No. 01-12257-PBS, December 16, 2004.

Hartman, Raymond S., Declarations in the matter *In re: Lupron Marketing and Sales Practices Litigation*, United States District Court, District of Massachusetts, MDL No. 1430, CA No. 01-CV-10861.

Second Amended Class Action Complaint, *New England Carpenters Health Benefits Fund; Pirelli Armstrong Retiree Medical Benefits Trust; Teamsters Health & Welfare Fund of Philadelphia and Vicinity; and Philadelphia Federation of Teachers Health and Welfare Fund, District Council 37, AFSCME - Health & Security Plan; June Swan; Maureen Cowie And Bernard Gorter v. First Databank, Inc., and McKesson Corporation*, United States District Court District of Massachusetts, October 31, 2006.

Saris, Judge Patti B., Memorandum and Order Re: Motion for Class Certification, *In re: Pharmaceutical Industry Average Wholesale Price Litigation*, United States District Court District of Massachusetts, MDL No. 1456, Civil Action No. 01-12257, August 16, 2005.

Other Documents

Berndt, E.R., "The U.S. Pharmaceutical Industry: Why Major Growth in Times of Cost Containment?" *Health Affairs*, 20(2), 2001.

Hall, Robert E. and Lazear, Victoria A., "Reference Guide on Estimation of Economic Losses in Damages Awards," Federal Judicial Center, *Reference Manual on Scientific Evidence*, 1994.

Manufacturers Divestiture Notice, as accessed June 29, 2006. http://www.medispan.com/Products/MFG_divestiture_notice.aspx

Rubinfeld, Daniel L. and Steiner, Peter O., "Quantitative Methods in Antitrust Litigation," *Law and Contemporary Problems*, 46(4), Autumn 1983.

Rubinfeld, Daniel L., "Reference Guide on Multiple Regression," Federal Judicial Center, *Reference Manual on Scientific Evidence*, 1994.